

MORRISON (W. A.)

THE

Value of the Stomach-Tube in Feeding after
Intubation, based upon 28 Cases;

Also, its use in Post-Diphtheritic Paralysis.

BY

WILLIAM ALEXANDER MORRISON, M.D.,
EAST BOSTON.

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THE VALUE OF THE STOMACH-TUBE IN FEED- ING AFTER INTUBATION, BASED UPON TWENTY-EIGHT CASES; ALSO ITS USE IN POST-DIPHTHERITIC PARALYSIS.¹

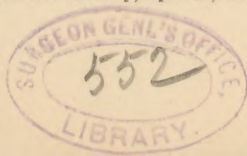
BY WILLIAM ALEXANDER MORRISON, M.D., EAST BOSTON.

ONE of the most serious difficulties met with by the physician who is called upon to treat the diseases affecting the throat is the inability of the patient to take a proper amount of nourishment. The cause of this is to be found partly in the mechanical obstruction produced by the swelling of the parts in certain diseases, or by paralysis of certain muscles in others, and in part also by the fear of the pain or discomfort produced by the attempt to swallow.

This is especially true of cases after the operation of intubation of the larynx, where, owing to a mechanical interference with the act of swallowing, regurgitation of the food into the larynx may occur, causing a violent paroxysm of coughing. This is frequently quite sufficient to cause a child to absolutely refuse all forms of nourishment. As it is in diphtheria that we find these conditions present more than in any other disease, the importance of the subject becomes at once apparent.

We have in this disease an active and deadly infection which rapidly destroys the vitality of the patient, and a lack of nourishment at a critical time may baffle our attempts to aid the system to resist this poisoning, and may result in the gravest disaster.

¹ Read before the Suffolk District Medical Society, April 28, 1894.



Many attempts have been made to nourish patients under these circumstances. Rectal alimentation has proved useful in many cases, but has fallen short of the desired effect because of the inability of the bowel to retain or absorb the proper amount of nourishment. We are, therefore, forced to rely upon some method of feeding which will permit food to be carried into the stomach without the act of swallowing, and for this purpose the systematic use of the stomach-tube possesses advantages over any other method.

The first case in which I had the opportunity of using this mode of feeding occurred while I was house-officer at the Boston City Hospital, in the service of Dr. A. L. Mason.

The patient was four years old, and was suffering from diphtheria; large glandular abscesses formed and purulent otitis was present.

During the fourth week after recovering from diphtheria, post-diphtheritic paralysis developed, and the child could not swallow. The respiration was eight to the minute; the pupils were contracted; the face was pale; the condition torpid. Rectal enemata proving ineffectual, I resorted to the stomach-tube, at first using only a gag, and passing the tube through the mouth into the esophagus, but afterward found it more easily accomplished by lubricating the tube and passing it through the nose.

By this method I fed the child with the tube for four weeks, giving six ounces of cream, two ounces of brandy, three drops, three times a day, of tincture of nux vomica, and a digestive ferment. The patient was unable to cry aloud or speak during this time, but gradually made a complete recovery. Without this treatment the child would undoubtedly have died.

The result in this case was so satisfactory, and the method of application so relatively easy, that I have

continued this treatment for the past four years in my private practice. In cases of intubation it has proved especially satisfactory. During this time I have performed the operation twenty-eight times. Twelve children have recovered, or forty-three per cent. I have personally attended to every detail without the assistance of a trained nurse in any case.

To obtain satisfactory results, and to prevent undue exhaustion in the child, certain precautions must be observed. Two assistants are required. The child is rolled in a blanket with the hands by the sides. The first assistant sits in a chair near the bedside, and holds the child firmly in a reclining position upon his left knee. The second assistant holds the patient's head immovable. A soft-rubber catheter, to which a funnel is attached, is lubricated and introduced into the nostril with the eyelet on the under side, as it offers less resistance in entering the naso-pharynx.

For nourishment, cream with about twenty per cent. of fat is used; and to aid digestion, Metcalf's liquor pancreaticus and Fairchild's essence of pepsin in equal parts are used, also brandy, tincture of nux vomica, and tincture of digitalis. Any preparation of iron or any other liquid medicine may be added according to circumstances.

If bichloride of mercury or calomel has been employed, it is omitted after intubation, owing to its tendency to irritate the stomach and intestines. On several occasions iron or digitalis has caused some nausea after being administered through the tube, but on omitting them this symptom has disappeared.

The following case proved very interesting on account of the emaciated condition of the patient, a child of six years, who had just recovered from whooping-cough. The pulse was very weak; the urine contained one-eighth per cent. of albumin. The

hygienic surroundings were very poor, the patient sleeping on a lounge in the kitchen. In fact, the poor child was suffering from neglect as well as from abject poverty. A grayish-white membrane covered the tonsils and uvula; respiration was very rapid; and the patient was unable to speak above a whisper. One-sixtieth of a grain of bichloride of mercury was administered every three hours; the throat was swabbed with hydrogen peroxide. The child passed a very restless night, refusing nourishment. On the following day it was much cyanosed, and had almost ceased to breathe. Intubation was performed at once, giving immediate relief; and one hour after, I gave through the stomach-tube six ounces of cream, one ounce of brandy, essence of pepsin and liquor pancreaticus, each half an ounce, continuing this four times daily. On the fifth day the tube was removed, and the patient made a good recovery, although in this particular case she was unable to speak aloud for six weeks.

Another illustrative case was as follows: A child six years old had been ill for forty-eight hours without medical attendance. I found her breathing badly, and it was very evident that mechanical interference was needed. Half an hour after, intubation was performed with instant relief.

Having ascertained that during the last twenty-four hours the patient had only taken one teaspoonful of brandy with water and four teaspoonfuls of milk, I introduced the stomach-tube and gave at each feeding eight ounces of cream, two ounces of brandy, liquor pancreaticus and essence of pepsin, each two drachms; the pulse being rapid, five drops of tincture of digitalis was given.

Eight hours after, in coughing, the child expelled the tube. The breathing then appeared natural for a time,

No.	Date.	Age.	Causes of Death.	Tube Worn.	Termination.	Remarks.
1	November 16, 1889	4 years	Septicemia	48 hours	Fatal	
2	December 3, 1889	3 years	....	5 days	Recovery	
3	December 24, 1889	5 years	....	4 days	Recovery	
4	January 14, 1890	4½ years	Extension	12 hours	Fatal	Tracheotomy. Death in 20 hours.
5	February 27, 1890	2½ years	Extension	24 hours	Fatal	Refused tracheotomy.
6	March 6, 1890	3 years	....	5 days	Recovery	
7	April 18, 1890	14 months	Extension	16 hours	Fatal	Tracheotomy. Death in 6 hours.
8	May 2, 1890	6 years	....	5 days	Recovery	
9	September 5, 1890	6½ years	Extension	48 hours	Fatal	Refused tracheotomy.
10	November 20, 1890	4 years	Extension	16 hours	Fatal	Tracheotomy. Lived 10 hours.
11	January 30, 1891	5½ years	....	5 days	Recovery	
12	March 15, 1891	6 years	....	5 days	Recovery	Eight hours after intubation coughed out tube. Ten hours after introduced larger one, as dyspnea had returned.
13	May 10, 1891	6 years	....	5 days	Recovery	
14	October 12, 1891	2½ years	Septicemia	2 days	Fatal	
15	November 28, 1891	3½ years	....	3½ days	Recovery	Complained of constant pain while tube was in larynx.
16	February 29, 1892	2 years	Broncho-pneumonia	18 hours	Fatal	
17	April 13, 1892	4 years	Tube plugged	30 hours	Fatal	Tracheotomy. Death.
18	June 5, 1892	3 years	Pneumonia	3 days	Fatal	
19	September 11, 1892	20 months	Extension	36 hours	Fatal	Refused tracheotomy.
20	October 12, 1892	4 years	Extension	24 hours	Fatal	Tracheotomy. Lived 10 hours.
21	November 16, 1892	3 years	Exhaustion	3 days	Fatal	
22	November 27, 1892	1 year	Extension	24 hours	Fatal	Refused tracheotomy.
23	January 3, 1893	4 years	....	4 days	Recovery	
24	March 18, 1893	4 years	Heart failure	24 hours	Fatal	
25	October 15, 1893	4½ years	....	5 days	Recovery	
26	November 19, 1893	16 months	Heart failure	12 hours	Fatal	
27	January 23, 1894	5 years	....	5 days	Recovery	
28	February 25, 1894	5½ years	....	5 days	Recovery	

Between 1 and 2 years	4	Secondary tracheotomy performed in five cases; all died. Septicemia, two cases, both died. Extension of membrane, eight. Broncho-pneumonia, one. Pneumonia, one. Tube plugged, one; tracheotomy performed. Exhaustion, one. Heart failure, two.
Between 2 and 3 years	6	
Between 3 and 4 years	7	
Between 4 and 5 years	4	
Between 5 and 6 years	6	
Between 6 and 7 years	1	

but in about ten hours I found it necessary to intube again, replacing the expelled tube with a larger one.

On the following day the patient coughed up a large amount of mucus having a disagreeable odor, and soon after most of the cream that was taken in the previous feeding was vomited. At the next regular hour for feeding, only four ounces of cream was given and liquor pancreaticus and essence of pepsin, each one-half an ounce, which were retained. From that time the patient took the full amount of nourishment, and at the expiration of five days was perfectly well.

To show the advantages of the stomach-tube in cases where intubation is not performed, the following case is interesting: A child four and a half years old was taken ill May 17, 1891. The tonsils and uvula were covered with membrane, the former unusually swollen, and in a few days a fetid odor was discernable. Ten days after formation of membrane, post-diphtheritic paralysis ensued, and the patient could not swallow. The pulse was very weak, the child could not rest day or night, crying incessantly. The mother became discouraged and said, when I mentioned stomach-tube, that she did not wish to torture the child, as she considered it a hopeless case. After much persuasion I resorted to feeding with the tube, through which was given daily, on an average, thirty ounces of cream, six ounces of brandy, essence of pepsin and liquor pancreaticus, two ounces each, twenty drops of tincture of nux vomica, and twenty drops of tincture of digitalis.

During the following week, the glands of the neck became very much swollen and discharged a great amount of pus; paralysis of hands and feet followed.

Treatment with the tube continued for about ten weeks, four times daily, when the patient was able to take some liquid food without regurgitation. At the expiration of four months, the child could walk quite

well, but it was fully six months before he had entirely recovered.

Now these few cases illustrate fairly well the results obtained in all cases that have come under my observation during the past four years. In all my cases of intubation, this method and no other has been used. No nourishment has been permitted by the mouth in any case.

There has been no difficulty in most cases in the digestion of the amount of food given, and, after the first few times, the child has suffered little or no discomfort during the passage of the tube. In comparison with the ordinary method of feeding these cases, it possesses the advantage of permitting a definite amount of food to be given to the child at regular intervals, thus giving the stomach its natural periods of rest. It is quite true that the Casselberry postural method permits food to be swallowed fairly well, but the great difficulty lies in the impossibility of making the parents or nurses realize the importance of this, and the child is permitted to take its food sitting up, with the result already stated. If a nourishment chart is accurately kept in these cases, the small amount actually taken is often appalling.

While this method of feeding is best carried out by the physician, it may, nevertheless, be taught to any intelligent nurse or parent.

In conclusion, we have, in feeding by the stomach-tube after intubation and in all other cases where there is interference with the act of deglutition, a method which is easy of application; which permits a definite amount of food to be placed in the stomach, thus fortifying the system against combined exhaustion and septic infection; which obviates both the discomfort and pain produced by the futile attempts to swallow; and which will also prevent the danger of deglutition,

pneumonia or suffocation. Now, if extended experience shall show that it possesses these merits, it seems probable that we shall find an increase in the percentage of children saved from this most insidious and deadly disease, and much of the incessant care and trouble in their management prevented.

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